

Applicant : Timothy J. Brosnihan et al
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Filed : June 29, 1999
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Attorney's Docket No.: 07043-060002 / B97-065-2

REMARKS

Claims 1-12 and 23-27 are pending. No claims are allowed. Claims 1, 23 and 24 have been amended.

1 New matter objection and rejection under section 112

The Examiner objected to the amendment filed August 28, 2002 under 35 U.S.C. 132, first paragraph, for allegedly introducing new matter to the disclosure. According to the Examiner, the original disclosure does not support the limitation "the first trench electrically isolating elements of the microstructure from each other" that was introduced to amend claim 1. The Applicant pointed to page 9, lines 20-25, of the application for support: "... isolation trench 18 electrically isolates the microstructure elements in structure region 14 from each other."

Furthermore, claims 1-12 and 23-27 are rejected under 35 U.S.C. 112, first paragraph, for allegedly containing subject matter, the above limitation, which was not described in the specification.

According to the Examiner, the first trench in the above limitation does not refer to the isolation trench 18, which includes a dielectric isolation layer, but the trench 60 from which the isolation trench 18 is formed. The Examiner also states that the isolation trench is not isolating the elements from each other alone, but in conjunction with a second trench.

First, claim 1 explicitly recites depositing the dielectric isolation layer in the first trench. Since the dielectric isolation layer is used for electric isolation, a skilled artisan would have clearly recognized that the first trench electrically isolating the elements refers to the first trench including the dielectric isolation layer, in accordance with the specification. Therefore, no new matter has been introduced.

Second, the isolation trench 18 clearly provides electrical isolation for the elements from each other. Contrary to the Examiner's statement, the claim does not imply that the isolation trench 18 is the only element providing electrical isolation for the elements from each other.

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However, claim 1 has been amended to clarify that the dielectric isolation layer is deposited to form an isolation trench, and the isolation trench provides electrical isolation for elements of the microstructure from each other.

2 Rejection under section 103

Claims 1-12 and 23-25 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 5,747,353 to Bashir et al. ("Bashir") in view of U.S. Patent No. 4,631,803 to Hunter et al. ("Hunter"). The applicant respectfully traverses.

Claim 1, as amended, recites a method of fabricating a microelectromechanical system. The method includes etching a first trench in a device layer, depositing a dielectric isolation layer in the first trench to form an isolation trench that electrically isolates a first region from a second region, and etching a second trench located in the first region. The second trench defines a microstructure including a plurality of elements anchored to the isolation trench such that the isolation trench provides electrical isolation for the anchored elements of the microstructure from each other.

Bashir discloses a micro-machined accelerometer using a silicon-on-insulator ("SOI") wafer structure. Although Bashir discloses an anchor trench 121 that can isolate a region in the wafer, Bashir's anchor trench 121 does not provide electrical isolation for the anchored elements of the microstructure from each other. For example, Bashir discloses electrodes 144 that are supported by sidewall oxide of the anchor trench 121 (Col. 7, lines 38-53). However, the electrodes 144 are not isolated electrically from each other by the sidewall oxide of the anchor trench 121.

Bashir discloses that the sidewall oxide can be removed from the anchor trench 121 so that the "subsequent filling of the trenches with polysilicon will cause the polysilicon to come into contact with the substrate 102 and silicon layer 106." That is, Bashir's device works without the sidewall oxide, i.e., a dielectric isolation.

The Examiner points out that the electrodes 144 should be electrically isolated from each other to make the accelerometer work. Assuming *arguendo* that this is correct, the required

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isolation of the electrodes 144 cannot be provided by the anchor trench 121 with the sidewall oxide.

As pointed out in reply to the previous office action, the electric isolation cannot be achieved by structures defined by the masks shown in FIG. 10, either. For example, the masks for the electrodes 144 (and even for the hanging mass 142) are defined by the same unbroken polygon with the same shading. Thus, these masks cannot be used to isolate electrically the electrodes 144 from each other.

Although Bashir does not explicitly disclose how the electrodes are isolated, it does disclose that photolithographic techniques are used to define buried layers, wells, and sinker regions in the SOI wafer 100. These regions are used for electrical connections of the common electrodes of the capacitors which form the sensing element(s) of the accelerometer. (Col. 4, lines 26-46.) Therefore, it appears that the electrodes 144 of Bashir are created by doping of portions of the silicon layer 106, and that the doped portions are isolated from each other by undoped portions of the silicon layer 106.

In sum, Bashir fails to disclose or suggest an isolation trench providing electrical isolation for the anchored elements of the microstructure from each other. Hunter is equally lacking. Hunter discloses only different structures for isolation trenches, as discussed in reply to the previous office action.

Because neither Bashir nor Hunter discloses or suggests the above limitation, claim 1 is in allowable form. Claims 2-12 and 23-25 are dependent claims depending from claim 1, and should be allowed for at least the same reasons as claim 1.

Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Bashir in view of Hunter in further view of U.S. Patent No. 5, 637,189 to Peeters et al. ("Peeters"). The applicant respectfully traverses.

As discussed above with reference to claim 1, neither Bashir nor Hunter discloses an isolation trench providing electrical isolation for anchored elements of the microstructure from each other. Peeters is equally lacking. Peeters discloses only a dry etch process for microelectromechanical systems.

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Because none of the references discloses or suggests the above limitation, claim 26 and 27 are in allowable form.

Applicant does not believe any fees are due; however please apply any outstanding charges or credits to Deposit Account No. 06-1050.

Ferenc Pazmandi has been given limited recognition under 37 CFR § 10.9(b) as an employee of the Fish & Richardson PC law firm to prepare and prosecute patent applications wherein the patent applicant is a client of Fish & Richardson PC and the attorney or agent of record in the applications is a registered practitioner who is a member of Fish & Richardson, which is the case in the present application. A copy of the Limited Recognition document, which expires December 6, 2003, is attached hereto.

Respectfully submitted,

Date: 10/27/2003


Ferenc Pazmandi
Limited Recognition under 37 CFR § 10.9(b)

Fish & Richardson P.C.
500 Arguello Street, Suite 500
Redwood City, California 94063
Telephone: (650) 839-5070
Facsimile: (650) 839-5071

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